**Market Opportunities for Employment-Intensive Sustainable Energies: Elements for a Strategy to Promote Local Employment and Value through RE/EE**

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| **Part 1: Structure and Evolution of the Political and Institutional Framework** | |
| **Policy Goals and Targets** | **National Energy Management Strategy (30/30 Strategy) (2014)[[1]](#endnote-1)**   |  |  | | --- | --- | | * **Electricity production from RE sources** * **Reduction of primary energy demand** (compared to the trend-based scenario**)** * **RE share of primary energy consumption** (without biomass) * **CO2 emission reductions** | * 30% (2030) * 17% (2020) and 34% (2030) * 7% (2020) and 12% (2030) * 48% (2030) |   Phase 1: Awareness raising (before 2014)  Phase 2: Continued implementation and voluntary investment (audits, lighting, buildings, …) (2014-2020)  Phase 3: Implementation of large scale projects in order to reach the 30-30 goals(2020-2030)  **Tunisian Solar Plan (PST) (2012)** elaborated by ANME but not officially adopted by parliament or government.   |  |  | | --- | --- | | **Target:** | **RE Source:** | | **30%** of the electrical energy mix from RE sources by **2030** (without hydro) (= 3 GW additional) | * + 15% from wind energy   + 10% from PV   + 5 % from CSP  *(maybe CSP will be removed or < 5%)* | |
| **Legal-Regulatory Framework** | **Energy Law 2004-72 (2004):** wise use of energy as a national priority and as the most important element of a sustainable development policy. 3 principal goals: energy saving, RE promotion and creation of new forms of energy.  **Decree 2144-2004:** Obligatory energy auditsfor companies that use more than 800 toe/year for production processes  **Act 2004-72 & corresponding implementation decree:** Mandatory measures for thermal performance of new buildings.  **Decree 2009-362:** for financial support for RE/EE programs  **EE** **Law 2009-7:** right for industry, agriculture and service sectorto **self-production** of electricity from RE sources and co-generation; surplus of up to 30% can be sold to STEG at annually **fixed tariffs (PPA).**  **New RE Law 12/2015 (April 205):** *– Decree for application will be published by end of March 2016 (development supported by an expert group of GIZ)*   1. **Self-production** from RE sources    * Authorization from STEG for LV, from MIE for MV and HV    * Transmission via the national grid (for a fee) and sale of surplus to STEG 2. **Production & sale in the local electricity market** (guaranteed purchase by STEG)    * Up to a certain limit (to be defined by decree): authorization by MIE to found a project company and to generate electricity (standard contract)    * Above this limit: via public tenders and state concessions 3. **Electricity exports**     * via public tenders and state concessions    * through the national grid (contract with STEG) or separate lines |
| **Support Programs and Financing Schemes** | **Public Tenders**  The new RE Law 12-2015 introduced public tendering for large RE installations in the local market as well as for electricity exports (with state concessions).  **Energy Transition Fund (FTE) (2014)**   * replaced the National Energy Management Fund (FNME), increasing its resources through a tax on consumed energy products (list of products subject to tax, tax rate and recovery procedure established by decree) diversifying strategies and extending actions * supports RE/EE projects accompanying the action plan 2014-2020 * subsidies of up to 40% of investment costs for ER/EE measures\*   **National Energy Management Fund (FNME)** – replaced by FTE in 2014   |  |  | | --- | --- | | **Field** | **Subsidy (% of investment costs)** | | Energy Audits | 70% (max. 30,000 TND) | | Intangible Investments | 70% (max. 70,000 TND) | | Investment in EE equipment | 20% (max. 100,000 TND) | | Cogeneration | 20% (max. 500,000 TND) | | Substitution of natural gas | 20% (max. 400,000 TND) | | Collective solar thermal installations | 30% (max. 150 TND/m2) | | Grid-connected PV installations | 30% (max. 15,000 TND/building) |   **PROSOL Programs within the Tunisian Solar Plan** (< 3 kWp)   |  |  | | --- | --- | | * grant covering up to 30% of investment support by ANME (through FTE)\* * credits with 5% interest rates for 5 years by STEG & Attijari Bank * net metering scheme for solar roof-top applications, recovery of investment costs through the consumer bill | | | **PROSOL Thermique (2005):** public support programs for SWH | * **PROSOL Résidentiel** * **PROSOL Industrie** * **PROSOL Tertiaire** | | **PROSOL ELEC (2010):** public support program for PV installations (25 MW installed by the end of 2015) |   (certification of installers by ANME, acceptance of installation by STEG)  **“Bâtiment Solaire” Program**   * subsidies of up to 30% of investment costs by FTE\* (will be revised) * also for installations > 3 kWp   ***\*Note:*** *The subsidies for solar PV projects under the FTE have been stopped in December 2015 (as resources were insufficient)*  http://www.at2e.org/images/TUNISIA_Dic_2014_9_3.jpg**Duty and tax incentives** For RE/EE equipment and commodities imported/used:   * reduction of custom duties from 18% to 10% * exemption from VAT   **Detailed Resources Mapping**  A detailed wind atlas for Tunisia has beendeveloped in 2009 and updated in 2015 by ANME. The project was financed by the Spanish Agency of International Cooperation for Development (AECID) and the Government of Navarra in collaboration with ANME. The wind maps are generated in GIS format at 1km x 1km resolution at different heights: 10m, 60m, 80m, and 100m. It can be accessed under <http://irena.masdar.ac.ae/?map=488>.  A solar atlas has so far not been developed for Tunisia.  Figure 1: Tunisian Wind Atlas. Source: ANME (2015). |
| **Grid and Market Access (Internal and External)** | **Private RE Market Access**   * Producers eligible for the **PROSOL ELEC** program * **Self-producers** generating electricity from **RE** sources * **Concession following a tendering by STEG**   **Grid Access**   * For MV & HV: yearly renewed **Electricity Supply Agreement** between STEG and the subscriber * For LV: consumer has to sign an **Application for the Supply of Electricity** * For self-producers: **Application for Authorization** to STEG (flat network fee for transporting output to the place of consumption; sale of surplus up to 30%) * For PROSOL ELEC Programs: yearly renewed **Purchasing Agreement** with STEG (tariffs set by ministerial decision) |
| **Other Issues (e.g. Zoning and Land Allocation)** | * There is **no official institution** responsible for land examination and allocation for RE projects * Self-producers must own the land; for wind projects, an authorization by the Ministry of Defense is needed |
| **Verification and Evaluation Mechanisms** | **Private Control Offices for RE (“Bureaux de Contrôle”)**   * Introduction envisaged by GIZ in collaboration with ANME and STEG to overcome bottlenecks and gridlock * Focus on reception / connection of small to medium scale PV (due to large number of new installations) * For large projects (PV, CSP, biomass and wind), mainly STEG will control installation (and maybe control offices)   **Quality Control of SWH** (developed within PROSOL program)[[2]](#endnote-2)   * Eligibility criteria for accreditation of suppliers and installers * QUALISOL label for SWH installers and certification of SWH * system of unannounced inspection visits to installers and suppliers * practical guide for installing SWH * Training program for installation and maintenance |
| **Open Issues / Reforms** | * Details of the implementing decree for the new RE law (Net-Metering / FiT?) * Accelerated / simplified approval of applications and reception of installations * Future exact conditions of access to the grid and of selling of surplus to STEG or third parties * Creation of a new regulatory body in 2016 |
| **Main Obstacles / Gaps** | * No long-term PPAs / No Feed-in Tariffs for RE * No detailed solar atlas published * Issues with the PV subsidy programs 🡪 management of the FTE fund * No land allocated for the development of large-scale wind projects and (private) large-scale solar projects * No institution responsible for land examination and allocation |

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| **Part 2: Structure and Evolution of the Energy System** | |
| **State & Key Properties of the Energy System** | **Production**  Compared to its neighbors Libya and Algeria, Tunisia has only limited reserves of fossil fuels. The oil production decreased during the last 30 years (by almost a half), whereas gas production tripled in the same time. In 2013, 98% of Tunisia’s electricity generation came from natural gas plants. Only 2% of the total production came from RE sources (wind and hydro). Thus, Tunisia is currently among the countries with a weakly diversified energy mix.[[3]](#endnote-3)  **Transmission/Distribution**  STEG controls the Tunisian power grid and has a monopoly on electricity transportation and distribution. The grid has three voltages (HV, MV and LW) and is interconnected with 2 lines each to the Algerian and to the Libyan grid. Since 2012, almost 100% of the Tunisian population is connected to the grid. According to STEG, blackouts in all three voltage grids have increased lately (primarily due to demand growth and poor maintenance). Since the early 2000s, STEG has developed an ambitious program for the expansion of the distribution network in order to improve the quality of supply and reduce technical losses.  **Consumption**  Energy consumption is equally distributed among the different socio-economic sectors: The industrial sector had the highest energy demand in 2013 with a share of 29.2% of the final energy consumption, followed by the transportation sector (public transport, use of cars, logistics transport) with 28.5% and households with 27.6%.  **Imports/Exports**  Due to the continuous sharp increase in energy demand, Tunisia, a net energy exporter until 2000, has become a net importer since then. In 2014, 49% of natural gas consumption was covered by domestic production; the remaining 51% was imported from Algeria.  Figure 2: Energy Consumption in Morocco in 2013, by sector. Source: own illustration based on: <http://www.iea.org/statistics/statisticssearch/report/?country=TUNISIA&product=balances&year=2013> |
| **State & Key Properties of Renewable Energies** | Given the continuously growing energy demand and the concurrent decline of Tunisian fossil deposits, the use of RE is an indispensable solution. The country has an average solar irradiation of 5.1 kWh/m²/day and in the north, the wind speed approaches 10 m/s in good locations. Based on the wind atlas the overall wind potential is estimated at 8 GW.  **Biomass**  In the 30-30 Strategy, a total installed capacity of 100-300 MW from biomass is envisaged in 2030.[[4]](#endnote-4)  **Wind**  STEG has implemented 3 wind parks until the end of 2014 with a total capacity of 244 MW (Sidi Daoud 54 MW, Bizerte 120 MW + 70 MW), which reflects the total current installed wind capacity in the country. 250 MW to 300 MW are foreseen under the EGCE Program (Etablissements Gros Consommateurs d’Electricité) and the Sidi Daoud extension plan.[[5]](#endnote-5) According to the 30-30 Strategy, an installed capacity of 755 MW is planned for 2020 and of 1.755 MW for 2030.  **Solar**   * **PV:** By 2015, about 25 MW of small-scale PV have been installed. According to the 30-30 Strategy, the installed capacity from small-scale PV will increase to 640 MW by 2030, as part of an overall installed PV capacity of 1.5 GW by then. For solar water pumps 8 MW are planned. The first large scale PV plant with a 10 MW capacity, co-financed by KfW and the NIF (Neighbourhood Investment Facility) and implemented by STEG, is due 2018 in Tozeur. Another 10 MW PV installation is foreseen in the south. * **CSP:**  So far, CSP plays no role in Tunisia and is perceived by private and public actors as not competitive compared to PV and wind energy. However, a 50 MW parabolic trough plant is currently planned by STEG with financing from an international consortium. According to the 30-30 Strategy, an overall installed CSP capacity of 400-600 MW is foreseen (but according to Tunisian sources this target might be reduced). * **SWH:**  Tunisia is the leader among North African countries in terms of overall achievements in the SWH sector. Currently more than 700,000 m2 of SWH are installed with every year about 80,000 m2 of new installations (almost exclusively in the residential sector).[[6]](#endnote-6) The 30/30 Strategy envisages the installation of 2.85 million m2 of SWH in the residential, industry and tertiary sector by 2030. |
| **State & Key Properties of Energy Efficiency** | According to the Arab Future Energy Index (AFEX) of RCREEE, among MENA countries Tunisia continues to stand out with the most comprehensive policy framework for EE improvements.[[7]](#endnote-7)  **National Action Plan 2014 – 2020 for energy savings[[8]](#endnote-8)**   * Industry: 51% * Buildings: 26% * Transport: 25%   Thermal renovation of about 300,000 residential and tertiary buildings until 2020.  **EE in the Industry[[9]](#endnote-9)**  The Tunisian industry accounts for the largest part of energy consumption. Companies consuming > 800 toe/yr are obliged to conduct energy audits regularly and for the start-up of a new energy-intensive company, experts have to examine the energy performance prior to its construction. It is estimated that the industrial sector has the highest energy saving potential until 2030.  **EE in the Tourism Sector**  According to ANME, the average energy saving potential of Tunisian hotels is 20%. Especially air-conditioning, room and water heating have a high energy saving potential.  **EE in Buildings**  Within the “Règlementation Thermique et Energétique des Bâtiments Neufs en Tunisie” (RTEBNT) program in Tunisia 46 demonstration projects (36 in the residential, and 10 in the tertiary sector) shall be implemented, accompanied by capacity development for stakeholders in the construction industry. The energy savings achieved per project are about 33%. The import and sale of incandescent light bulbs is banned altogether and in 2014, a strategy was adopted to distribute 4 million LED light bulbs freely in order to replace incandescent lamps in the residential sector. [[10]](#endnote-10) |
| **Price Setting & Price Reforms** | **Subsidies**  Currently, electricity prices in Tunisia are **subsidized in the order of about 20%** over the price of natural gas. These subsidies are planned to be **reduced in several stages** and the price is to be gradually adjusted to world market levels. Energy prices are set by the Ministry of Energy on the basis of a proposal by STEG. In 2014, electricity prices were increased by approx. 10% and electricity subsidies for consumers with > 300 kWh per month were eliminated completely. Gasoline, LPG and diesel, however, are still highly subsidized.[[11]](#endnote-11)  **Electricity Price System**  In order to encourage customers to a rational use of electricity, the **electricity prices are differentiated**: For the industry, there are several tariffs. In the MV range, clients can choose between a uniform and a graded daily tariff; while for HV electricity tariffs vary according to the time of the day. For private households, the electricity tariffs differ depending on the consumption level.[[12]](#endnote-12) |
| **Market Opening / Unbundling** | **STEG** currently still holds a **monopoly** in various areas of the electricity sector including **transmission, distribution** and the purchase and sale of electricity. It also continues to own approx. 4/5 of the electricity production capacity.  In order to **liberalize electricity production**, in 1996 the private sector was given the opportunity to generate electricity through law 96-2787. Independent Power Producers (**IPPs**) can produce electricity in the context of **BOO** projects (Build Own Operate) and sell it to STEG. The projects are awarded on the basis of **public tenders** by the Ministry of Energy and have to be state-approved. The power generation by IPPs, however, does not need to be based on RE.  As part of the energy strategy of 2009, **self-generation** from RE sources was allowed, and a certain share of the generated electricity (currently 30%) can be sold to STEG.[[13]](#endnote-13) |
| **Main Institutional Actors in Energy-Related Fields** | 1. **Ministries and other institutions**   **Ministry of Energy and Mines (MIE)**  **🡪 Energy Division (DGE)** under the Ministry of Energy   * develop & implement the national energy policy * draft energy action plans & energy management programs * National Energy Observatory responsible for data collection and reporting   **Tunisian Company for Electricity and Gas (STEG)**   * created by law 62-8 in 1962 * national energy utility, transmission system operator (TSO) and key supplier of power and gas   **National Agency for Energy Management (ANME)**   * proposes & implements state policy to promote RE, EE & clean technologies * defines requirements & standards for related professions, services & installations * carries out supportive actions for education & training in the field of RE/EE * manages the FNME/FTE, grants financial aid to RE/EE projects  1. **Regulator**   No regulator so far; creation of a new regulatory body in 2016.   1. **Electric Utilities in Morocco**  |  |  | | --- | --- | | * Main Producers (share of electricity production in 2013) | | | **Public Producer** | **Private Producers** | | **STEG (82%)** | **IPPs (18%)**: Carthage Power Company (CPC) & Société d’Electricité d’El Bibane (SEEB)  **Self-Producers (0.4%)**  There are still no IPPs producing RE and no RE auto-producers in practice (except production of electricity by PV systems in buildings (PROSOL)).[[14]](#endnote-14) | | * Transmission System Operator & Distributor | | | **STEG (100%)** | | |
| **Open Issues / Reforms** | * Increase of energy prices * Reform of fossil fuel subsidies |
| **Main Obstacles / Gaps** | * STEG monopoly (single buyer) * Conditions of access to the grid * Still highly subsidized prices of many fossil fuel products (esp. gas/electricity in the industry/farming sector) |

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| **Part 3: Structure and Evolution of Local Benefit Sharing** | |
| **Observable / Forecasted Value Creation** | **Economic Value Creation:**   * **Local Manufacturing/Construction:** very weak local content in first wind turbine projects by STEG in Sidi Daoud (2009) and Bizerte (2011–2012) (wind tower manufacturing, cables, electrical works and construction); raw materials for construction available (steel, concrete, cement), already existing skills and capacities for local component manufacturing and installation with regard to PV and SWH; for CSP, local manufacturing of steel structures possible.[[15]](#endnote-15)   **Social Value Creation:**   * **Access to electricity:** 100% since 2012 * **Energy security:** through autonomous PV installations   **Environmental Impacts:**  All RE/EE initiatives implemented from 2005-2010 have made it possible to achieve accumulated energy savings of around 2,700 ktoe (of which over 90% can be attributed to EE initiatives) and emission reductions of 6,500 ktCO2e. |
| **Observable / Forecasted Job Creation** | **Potential Employment Effects[[16]](#endnote-16)**  Within 5 years, 100 million TND investment in:   |  |  | | --- | --- | | * **Construction & Installation of:** | * **Operation & Maintenance of:** | | * **PV** power plant generates 70 - 130 jobs * **CSP** power plant generates 76 jobs * **Wind** power plant generates 122 jobs * **SWH** generates 300 jobs | * **PV** power plant creates 8 jobs * **CSP** power plant creates 30 jobs * **Wind** power plant creates 50 jobs * **SWH** generates 50 jobs | | * **Thermal insulation** generates 394 jobs |  |   **Observable Job Creation**  So far, in Tunisia employment creation has occurred in the RE sector, with 975 new jobs through RE and 174 new jobs through EE between 2005 and 2010.[[17]](#endnote-17)  As for RE, most of those jobs have been created in the solar thermal sector, especially by the installation of SWH in residential buildings. The number of PV- and wind-related jobs was initially very low, but employment is currently growing in the PV sector and are also likely to extend to the wind sector, once the first tenders under the revised PST are being launched.  Figure 3: Evolution of number of RE/EE Jobs in Tunisia from 2005 to 2010. Source: own elaboration based on: GIZ (2012): "Renewable energy and energy efficiency in Tunisia – Employment, qualification and economic effects"  As for EE, most jobs have been created through energy audits, especially in the industrial sector. Employment gains through energetic upgrading of the building sector are likely to be high, but depend on a more systematic enforcement of existing legislation.  **Forecasted Job Creation**  According to the Tunisian Solar Plan and a 2012 GIZ study (which is currently being updated), the increased usage of RE/EE will generate additional employment for 7,000 to 20,000 people until 2030, mainly by installation and M&O activities. With regard to employment generated per investment of 100 million TND, EE in buildings will generate the most employment, followed by SWH and PV and finally by wind energy and CSP.[[18]](#endnote-18)  Figure 4: Forecasted Job Creation until 2030 in Tunisia, by RE technology. Source: <https://www.giz.de/fachexpertise/downloads/giz2012-en-employment-renewable-energy-tunisia.pdf>  **Wind**  The job potential in the wind energy sector exists mainly for the manufacturing of components, for civil works and for wind forecast services (academic jobs). Tunisia has a local industry capable of supplying various wind farm components (towers, cables, transformers, control panels, display panels, regulators, etc.). The required skills for rotor blade manufacturing are currently not available in Tunisia.  **PV**  A job potential exists mainly in the production of electronic equipment, cables and support structures as well as in the development and construction of PV panels and plants. PV module manufacturing is also seen as a promising future perspective as skills already exist and several production facilities have already been established which could increase their production capacities should the market demand it.  **CSP**  No production line for core CSP components exists in Tunisia and few market actors are currently able to manufacture these. The highest job potential derives from the production of mounting structures and basic (e.g. electrical) components, and from the execution of civil engineering and construction works.  **SWH**  Tunisian companies are already active in the manufacturing of components and systems, plus in the planning and the installation of systems mainly for residential use (thus covering the entire value chain). Challenges exist with regard to reinforcing the quality of systems and services and to developing an R&D activity in order to be able to deal with the regional and global competition and to maintain (and further expand) the number of jobs. Assuming an equipment of 30% of new buildings and 35% of existing buildings with SWH, it is estimated that by 2030, 1,200 jobs will be created; 600 in manufacturing and 600 in installation and maintenance (those estimates are based on experiences from the PROSOL program).[[19]](#endnote-19)  **EE in Buildings**  In the buildings sector, interest in thermal insulation has been rising, and several operators have started to position themselves in the market. If there is an upscaling of activities, this field has significant potential for the creation of direct and indirect employment, particularly through the realization of works and the production of inputs. Furthermore, energy-saving lamps are already being manufactured locally and the industry is expanding in order to meet the growing demand for these products. A Plan Bleu study estimates additional employment in the building sector by 2030 between 26,600 and 36,600 (including SWH). A new study on job effects through EE in the building sector is currently being set up by GIZ (RE-ACTIVATE together with Green Mosques). |
| **Existing Training & Research Capacities** | The following vocational **training providers are currently active in the field of RE/EE in Tunisia:**   * AFNOR Tunisia * TUV Maghreb * German Tunisian Chamber for Industry and Commerce (AHK Tunisia) * Agence Nationale de Maîtrise de l’Energie (ANME) * Centre International des Technologies de l'Environnement (CITET) * Technopole de Borj Cedria (TBC)/Ecopark: Research and Technology Center of Energy (CRTEn) * Centre national de formation continue et de promotion professionnelle (CNFCPP) * Agence tunisienne de la formation professionnelle (ATFP) * Instituts supérieurs d’enseignement technique (ISET) * 2 PV training centers in Khledia and El Hamma (built up by SEQUA in cooperation with ATFP) * KNAUF   Several institutions offer continuing education (SWH, PV, solar water pumps, EE, energy management, etc.). However, these trainings are still mostly designed and implemented in an “ad hoc” fashion, to quickly respond to market needs and skill gaps, without being properly integrated into the national TVET system. Moreover, many of these trainings are designed and implemented without taking into account the needs and expectations of the companies active in these areas.  **ANME** carries out many continuing education initiatives as part of its mission (incl. for energy auditors, engineering consultants, architects, liaison experts, equipment installers, energy managers, project developers, etc.). In addition to that, **ATFP**, which manages 136 vocational training institutions, and a few private institutes offer training in the field of RE/EE. For example, **TÜV Maghreb** works closely with the TÜV Rheinland and offers trainings accredited by the MFPE in different fields, including on energy management, EE and the training of trainers. **TBC/Ecopark** combines the promotion of businesses, specific R&D and training offers. In the field of EE/ER, TBC has competencies and trainings mainly in the field of PV and solar thermal installations and EE measures for industrial production. It offers established continuing training on demand concerning mainly the PV and solar thermal sector and companies that fulfil the requirement to be accredited as solar installers. The **CRTEn** contributes in an effective way to post-graduate formation and owns three laboratories (PV Laboratory, Thermal Process Laboratory and Laboratory of Wind Power Control and Energy Valorization of Waste).  A **Skills Training Center for SWH** is currently under development by Biome Solar Industry, a SWH manufacturer, with the support of GIZ. The center shall offer courses for installation technicians, maintenance and service personnel as well as technical controlling and supervision of SWH. Other EE/ER curricula may be implemented in the future.  Throughout the country, there are 3 certified RE/EE-related **national vocational training** programs offered, which however differ in quality so far:   * “Sanitation and thermal installer” & “Caretaker air conditioning” (incl. solar thermal energy):  **Professional Aptitude Certificate CAP** * “Centralized Technical Management of Buildings” (incl. O&M of energy-saving equipment):  **Vocational Training Certificate** **BTS**   ANME elaborated together with CSNER (Chambre Syndicale Nationale des Energies Renouvelables) a charter to uphold quality standards for solar thermal installers, called “Qualisol”. The charter, however, remains voluntary and has not been implemented as an obligatory quality standard in the training institutions.  No training programs or training infrastructures exist for wind energy maintenance technicians / service personnel.  The **roles** in the Tunisian vocational training system for RE/EE are in principle clearly assigned. However, once a private training provider or program is accredited, **no standardized controls** ensure the quality of the training and the exams. |
| **Anticipated Training & Research Needs** | **Identification of Skill Needs**  RE/EE skill needs and gaps have to be identified properly in order to design and/or adapt training curricula, training standards, infrastructures and train-the-trainer programs and to develop the necessary certification and quality control system. By now, skill needs and gaps have not (sufficiently) been taken into account when developing and implementing policies and programs. |
| **Further Innovation Related Institutions** | **Borj-Cedria Science and Technology Park**   * 3 centers with test and research facilities and qualified, experienced human resources   **Energy Research and Technology Centre (CRTEn)**   * development and integration of energy technologies, scientific and technology monitoring * focus on PV systems (lighting, irrigation and water desalination) and the use of solar and wind power   **Pôle de Competitivité de Gafsa (PDG)**   * Focus on R&D, trainings, infrastructure and industrial activities   **Centre International des Technologies de l’Environnement de Tunis (CITET)**   * Streamlining, transfer and innovation of eco-technologies and promotion of clean technologies   **Research and Technology Center of Energy (CRTEn)**   * Technology platform with pilot R&D actions in the accompaniment and development of innovation companies working in various energy sectors, particularly in new and renewable energies.   **Agency for the Promotion of Industry and Innovation (API**)   * Support structure for companies and promoters (5 centers and 24 regional offices) |
| **PSD / HCD Support Mechanisms** | **Private Sector Development Support**   * Guichet Unique (one stop shop) of the Tunisian Industry Promotion Agency (API) * Guichet Unique CERT of the Ministry of Information Technology and Communication * Fund to promote and decentralize the Industry (FOPRODI) * Fund to develop Competition in the Industrial Sector (FODEC) * Fund for Access to Export Markets (FAMEX) * Bureau for the National Modernization Program for Industry (BMN) * Both start-up and SME support (enterprise incubators, technopôles, technical centers at provincial level, online project declaration, …) * Bank for Financing SMEs (BFPME) under the Ministry of Finance * Incentives for new companies: 10years income tax exemption; those which are situated in certain areas of the country will receive a state subsidy for employer contributions.   **Human Capacity Development Support**  Vocational Training Tax (TFP):   * 1% of the total salary cost for manufacturing enterprises, and 2% for others * Vocational trainings offered to the staff can be deducted within a year from this tax   Competency Based Approach (in vocational training) |
| **Labor Market / Employment Mechanisms** | **National Observatory for Employment and Skills (ONEQ) (since 2000)**   * under the Ministry of Vocational Training and Employment * full component of the national statistics system * to develop an information system on the labor market, to conduct analyzes on employment and skills and to disseminate the results of these analyzes |
| **Main Institutional Actors in Sustainable Economic Development** | **Ministries and Affiliated Bodies**   |  |  | | --- | --- | | Ministry of Vocational Training and Employment (MFPE) | National Agency for Employment and Independent Work (ANETI)  Tunisian Agency of Vocational Training (ATFP)  National Center for Continuous Training and Professional Promotion (CNFCPP)  National Center for Trainer Training and Training Engineering (CENAFFIF) | | Ministry of Education | National Commission of Education, Science and Culture (CNESC)  National Center of Education Technologies (CNTE)  National Center of Pedagogical Innovation and Education Research (CNIPRE)  National Center of Training of Trainers (CNFF) | | Ministry of Industry | Agency for Promotion of Industry and Innovation (APII)  Agency for Foreign Investment Promotion | | Ministry of Energy and Mines | Tunisian Company of Electricity and Gas (STEG)  Tunisian Enterprise for the Petroleum Sector (ETAP)  National Organisation for Energy Conservation (ANME) | | Ministry of Agriculture, Water Resources and Fishery | Agency for Promotion of Agricultural Investments (APIA) | | Ministry of Finance | Bank for Financing SMEs (BFPME) | | Ministry of Environment | National Commission of Sustainable Development (CNDD) | | Ministry of Trade | National Consumption Institute (INC)  Tunisian Trade Office (OCT)  Export Promotion Center (CEPEX)  Trade and Industry Chambers | | Ministry of Regional Development | General Commission of Regional Development (CGDR) | | Ministry of Transport | Technic Agency for Land Transport (ATTT)  Enterprise of Transport in Tunis (STT)  National Enterprise of Interurban Transport (SNTRI)  Office of Merchant Navy and Harbors (OMMP)  Office of Civil Aviation and Airports (OACA)  National Institute of Meteorology (INM) |   **Concerned industrial and professional associations:**   * German Tunisian Chamber for Industry and Commerce (AHK Tunisia) * Tunisian Association of Wind Energy, CNSPV * Tunisian Union of Industry, Trade and Handicrafts (UTICA) * Tunisian General Labor Union (UGTT) |
| **Relevant Private Sector Actors** | **Main R&D, Manufacturers & Installers (selection):**  There are currently 6 Tunisian manufacturers of PV modules and SWH systems active in the market:   |  |  | | --- | --- | | * AURASOL * Energy Industries * IFRISOL * Biome Solar Industry (BSI) | * NR Sol * Green Panel Tech * Vincent Industrie |   The number of importing and installation firms is significantly larger. Among the largest firms are:   |  |  | | --- | --- | | * VOLTA PV * AES Energy Systems * Gamco * New Energy * SATER SOLAR | * Shams Energy * Spectra * Sines * Sunsol Energy |   **Wind**: Wind towers are currently being manufactured and even exported by SOCOMENIN, a company specialized in steel construction.  **STEG Energies Renouvelables (STEG ER)** (private company): branch fully devoted to RE (project implementation and promotion) |
| **Open Issues / Reforms** | * Matching of market / company needs and education / training programs, incl. via on-the-job trainings (reform) * Introduction or enforcement of quality standards for RE/EE products and services (incl. trainings) |
| **Main Obstacles / Gaps** | * RE/EE market still very small and fragmented * Persistent institutional and administrative barriers and delays * Insecurity about direction and determination of public policy * Difficulties in accessing off-takers and capital providers * Difficulties in finding qualified local suppliers and employees * Lack of visibility for and confidence by consumers |

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| **Part 4: Anticipated Market Development by 2020/30** | | | |
| **Generation** | **Existing Capacity** | **Additionally planned projects** | **Targets** |
| **PV** | 25 MW | 20 MW | 1.5 GW (by 2030) |
| **CSP** | 0 MW | 50 MW | 400 – 600 MW (by 2030) |
| **SWH** | >700,000 m2 |  | 1 million m2 (by 2016)  2.85 million m2 (by 2030) |
| **Wind** | 244 MW | 250 – 300 MW | 755 MW  1,755 MW (by 2030) |
| **Biomass** | 0 MW |  | 40 MW (by 2016)  100 – 300 MW (by 2030) |
| **Efficiency** | **Low** | **Moderate (BAU)** | **High** |
| **Buildings** |  |  | 26% against BAU scenario (2020) |
| **Industry** |  |  | 51% against BAU scenario (2020) |
| **Transport** |  |  | 25% against BAU scenario (2020) |
| **Agriculture** |  |  |  |
| **Socio-Economic Impact** | **Low** | **Moderate (BAU)** | **High** |
| **GDP growth (% p. a.)** |  | 2.56% [[20]](#endnote-20) |  |
| **Value Added** |  |  | 22.5 billion TND savings on the power bill (2014-2020) (ANME) |
| **Employment** | EE in Buildings (2030): (Plan Bleu)  26,690 new jobs | Overall Unemployment Rate reduction from 15.3% to 15.21%  EE in Buildings (2030): (Plan Bleu)  31,600 new jobs | 12,000 new jobs (by 2030), especially in RE (ANME)  EE in Buildings (2030): (Plan Bleu)  36,600 new jobs  SWH (2030): (Plan Bleu)  1,200 new jobs (600 in manufacturing; 600 in installation & maintenance) |
| **Welfare** |  |  | 46 MtCO2 avoided (2014-2020)  139 MtCO2 avoided (2020-2030)  22 MtCO2 avoided (in 2030) (=44% of BAU scenario) |

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| **Part 5: Most Relevant Interlocutors & Cooperation Partners for RE-ACTIVATE** | | | |
| **Actor** | **Name** | **Focus** | **Opportunity for Cooperation** |
| **GIZ:**   * **Sustainable Infrastructure: Energy/Water Environment** * **Sustainable Economic Development: PSD/EP/TVET** | *Planned:* 2013.9035.0: Support for the Implementation of the Tunisian Solar Plan (DKTI) (start: 2017, uncertain)  2012.9296.0: Secretariat of the German-Tunisian Energy Partnership  (2013-2015)  2013.2237.9: Market Development for Decentralized Solar Energy (DMS) (2013-2016)  2011.9074.3: Energy Efficiency in the Tunisian Industry (DASTII) (2013-2017)  2014.9087.9: Improvement of Initial and Further Training Capacities for the Development of the Tunisian Solar Market (2015-2016)  2012.2488.0: Regional Fund for the Qualification and Employment Promotion of Young People  2014.9087.9: Innovation, Regional Economic Development & Employment (IDEE)  2014.0967.1: Innovations for Agriculture and Agri-Food Sector (IAAA) (2015-2017)  2013.2236.1: Promotion of Sustainable Agriculture and Rural Development (PAD) (2013-2016)  Support for Regionalization Project, IS SUDEP Project | Support the Supply and Use of Sustainable Energy  Collaboration between German and Tunisian public and private stakeholders  Sustainable market for small and medium-sized solar plants (PV and solar thermal)  Enhance know-how of stakeholders and implementation of EE  Enhanced employability and further vocational training improvement in the solar market  Enhance number of independent and employed young people  Promote economic development of disadvantaged regions  Income, Employment and Food Supply in Rural Areas  Productivity, Income and Competitiveness (in mid- and north-west regions of Tunisia) | Orientation towards employment-intensive markets / technologies  RE/EE market development  B2B Networking & Cooperation  Promoting market opportunities and quality standards for private firms;  Promoting RE/EE in AGR/IAA  Identifying EE market opportunities, employment effects and skill gaps;  Carrying out EE pilot projects and training offers in the industry  Implementation of training standards + quality assurance for trainings + training providers  Integrate RE/EE component in trainings / jobs  Identify and promote RE/EE in selected AGR/IAA market segments  Identify and promote RE/EE in selected AGR/IAA market segments  Identify and promote RE/EE in selected AGR/IAA market segments  Cooperation with ACTE Project |
| **Non-GIZ:**   * **Domestic public institutions** * **Private sector/ civil society** * **International organizations on the ground** | ANME, STEG, ATFP, APIA  ANME  RE Cluster & Cluster Mécatronique (CMT) CSNER, CSIPV  KfW, RCREEE, AfD, BERD, UNOPS, UNDP | RE/EE Training Component  ANME + PTB planned project 2016 (Improvement of the quality infrastructure for PV in Tunisia | Training standards and quality assurance mechanisms  Certification of PV components and installers  Cluster Cooperation / develop strategy and activities (see cluster study) |

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| **Part 6: Identifiable Future Opportunities for German International Cooperation** | | | |
| **Sector** | **Objectives** | **Outcomes** | **Partner** |
| Wind | Improve local skills for wind turbines installation and maintenance  Optimize local value and job creation | * Implement trainings for wind sector (focus maintenance) * Create new markets for manufacturers, service providers, and workers | STEG  IFMEREE Morocco / DKTI I Morocco  RCREEE / Wind Training Center |
| EE | Identify and quantify local and regional markets for EE products and services, incl. supply and demand of skills and capacity; enhance quality of products and services; improve EE in Buildings and Industry | * Market potentials and local participation correctly assessed * Skill & capacity shortages & needs + quality gaps correctly assessed * PSD + training offers for EE in buildings/industry implemented * Quality assurance mechanisms in place and effects | ANME  IFMEREE Morocco / DKTI I Morocco  Cluster EMC, training institutions,  RE-ACTIVATE Morocco  RCREEE, MEDENEC, UNIDO-NCPCs |
| PV / SWH | Quality improvement of PV / SWH products and installers, accompanying upscaling (MV / HV applications for PV, collective / industrial use for ST) | * Improved trainings for SWH / PV manufacturers and installers * Introducing / enforcing effective / intl. compatible quality standards for PV / SWH manufacturers and installers (such as Qualisol) | DMS, PTB;  RCREEE, ATFP, ANME, CENAFFIF, CNSPV |
| Solar Water Pumping | Enhance application of solar water pumps | * Awareness raising, quality support, training offers for solar water pumping | IAAA, PAD, AGIRE |
| RE/EE capacity building | High-quality skill building at both TVET and HE level, plus for technicians, managers, administrators and financiers | Develop / Integrate quality assurance mechanisms for trainings and training providers | ATFP / ANME / CENAFFIF, UTICA etc.  RCREEE, DMS |
|  |  |  |  |
| RE/EE quality enforcement | Ensuring effective and reliable products and services according to intl. compatible quality standards | * Local manufacturers and service providers are subject to regular tests and public scrutiny; failure to perform leads to market exit | ANME, professional, industry & consumer associations  RCREEE, DMS, PTB |
| Biomass | Introduce adapted biomass technologies into the local market | * Study biomass potential (market development, job effects, training needs) | ANME |

1. ANME (2014): 30/30 – Stratégie Nationale de Maîtrise de l’Energie <https://giz.de/en/downloads/giz2014-fr-strategie-energie-tunisie.pdf> [↑](#endnote-ref-1)
2. ANME (2014): The Tunisian solar thermal market: a change of scale <http://ac.els-cdn.com/S1876610214004457/1-s2.0-S1876610214004457-main.pdf?_tid=7b18283e-c5a4-11e5-ba73-00000aab0f01&acdnat=1453974773_5560302d0d9e77825882af7112bba5be> [↑](#endnote-ref-2)
3. AHK Tunesien (2015): Zielmarlt Analyse Tunesien - Photovoltaik-Dachanlagen und Speichertechnologien <https://www.export-erneuerbare.de/EEE/Redaktion/DE/Downloads/Publikationen/AHK_Zielmarktanalysen/zma_tunesien_2015-pv.pdf?__blob=publicationFile&v=3> [↑](#endnote-ref-3)
4. ANME (2014): 30/30 – Stratégie Nationale de Maîtrise de l’Energie <https://giz.de/en/downloads/giz2014-fr-strategie-energie-tunisie.pdf> [↑](#endnote-ref-4)
5. Dii (2013): The Economic Impacts of Desert Power - Socio-economic aspects of an EUMENA renewable energy transition [↑](#endnote-ref-5)
6. MED DESIRE (2015): Opportunities for the introduction of a solar thermal regulation in hammam Sousse <http://www.med-desire.eu/index.php?option=com_docman&task=doc_view&gid=1119&Itemid=612&lang=it> [↑](#endnote-ref-6)
7. RCREEE (2015): Arab Future Energy Index - AFEX 2015 Energy Efficiency [↑](#endnote-ref-7)
8. ANME (2014): 30/30 – Stratégie Nationale de Maîtrise de l’Energie [↑](#endnote-ref-8)
9. AHK Tunesien (2014): Factsheet Tunesien [↑](#endnote-ref-9)
10. RCREEE (2015): Arab Future Energy Index - AFEX 2015 Energy Efficiency [↑](#endnote-ref-10)
11. World Bank (2015): The Socioeconomic Impacts of Energy Reform in Tunisia <http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/06/17/090224b082f428eb/2_0/Rendered/PDF/The0socioecono00simulation0approach.pdf> [↑](#endnote-ref-11)
12. AHK Tunesien (2015): Zielmarkt Analyse Tunesien - Photovoltaik-Dachanlagen und Speichertechnologien [↑](#endnote-ref-12)
13. AHK Tunesien (2015): Zielmarkt Analyse Tunesien - Photovoltaik-Dachanlagen und Speichertechnologien [↑](#endnote-ref-13)
14. RCREEE (2012): Renewable Energy Country Profile Tunisia <http://www.rcreee.org/sites/default/files/tunisia_fact_sheet_print.pdf> [↑](#endnote-ref-14)
15. EIB & IRENA (2015): Evaluating Renewable Energy Manufacturing Potential in the Mediterranean Partner Countries <http://www.eib.org/attachments/femip_study_evaluating_renewable_energy_manufacturing_potential_en.pdf> [↑](#endnote-ref-15)
16. GIZ (2012): Renewable energy and energy efficiency in Tunisia – Employment, qualification and economic effects <https://www.giz.de/fachexpertise/downloads/giz2012-en-employment-renewable-energy-tunisia.pdf> [↑](#endnote-ref-16)
17. GIZ (2012): Renewable energy and energy efficiency in Tunisia – Employment, qualification and economic effects [↑](#endnote-ref-17)
18. Energypedia (retrieved 23.01.2016): <https://energypedia.info/wiki/Employment,_Qualification_and_Economic_Effects_-_Energy_Situation_in_Tunisia> [↑](#endnote-ref-18)
19. Cuq, A. et al. (2011): Employment impact of development in rational use of energy and renewable energy sources in SEMCs; Plan Bleu [↑](#endnote-ref-19)
20. <http://www.tradingeconomics.com/tunisia/forecast> [↑](#endnote-ref-20)